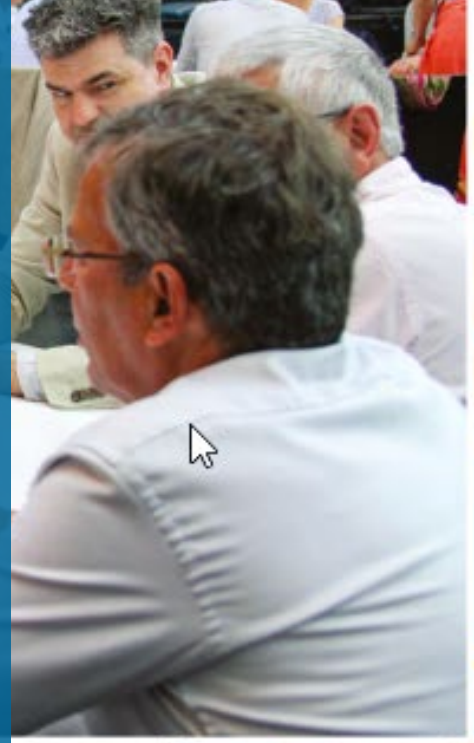
NEA
NUCLEAR ENERGY AGENCY

Safety case communication and stakeholder engagement - German approach and IGSC experience

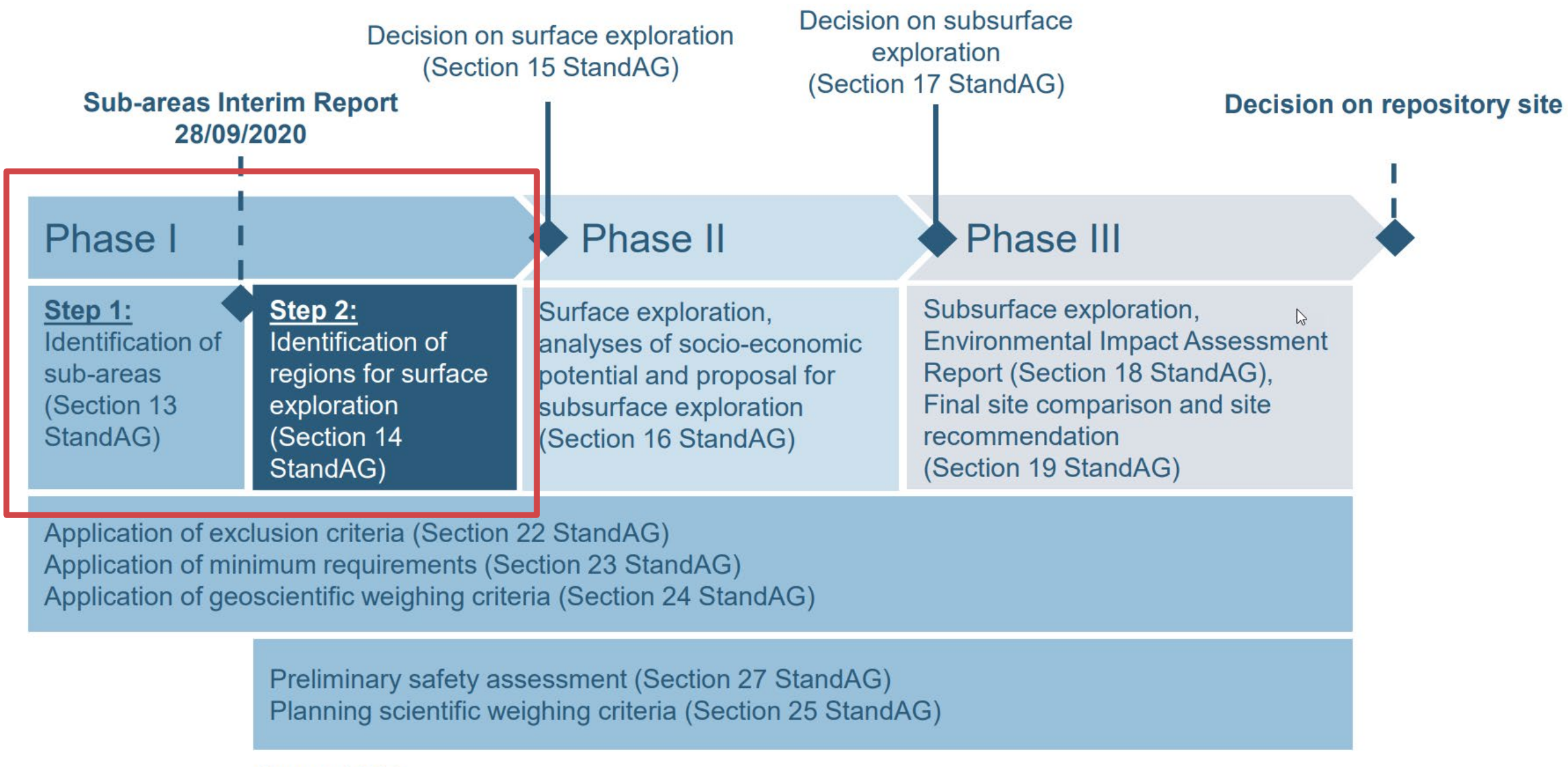


Ulrich Noseck

Gesellschaft für Anlagen- und Reaktorsicherheit (GRS)gGmbH

Seventh Edition of the International Conference on Geological Repositories (ICGR-7)
Busan, South Korea, 27-31 May 2024

Implementation of the Site Selection Procedure in Germany



Source: BGE

Stepwise process with public participation during siting

Process defined in German "Site Selection Act (Standortauswahlgesetz, 2017)"

Throughout the entire process

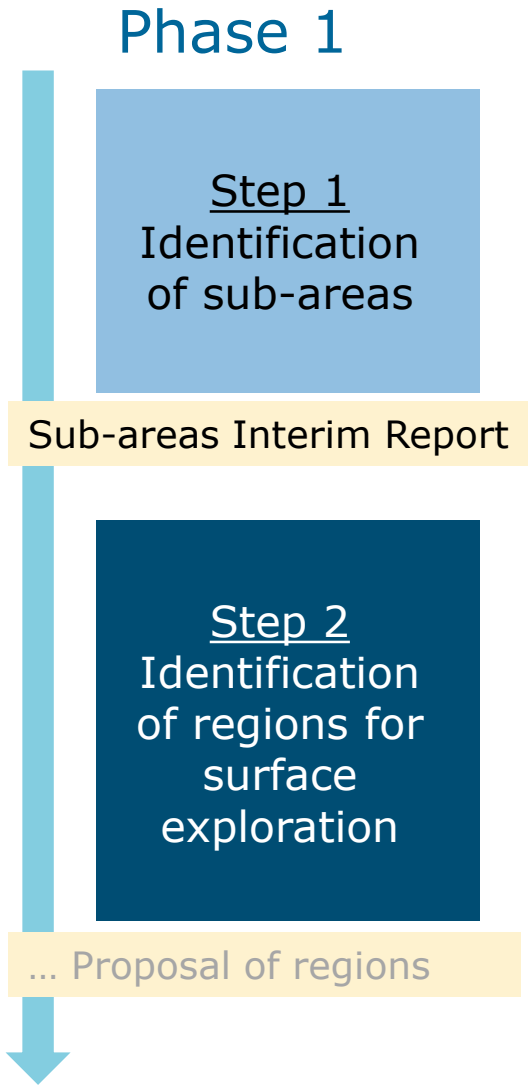
- Various committees and formats for continuous participation of citizens
- Commenting procedures and discussion meetings

After step 1: **Subareas conference** (October 2020 - August 2021)

- Started by German regulator BASE but then self-organised by citizens
- Well accepted, e.g. 800 participants in February 2021
- 54 % of the federal territory has been designated as sub-areas
- Proposed a participation format for step 2

During step 2: **Repository Search Forum**

- Cooperative approach by BASE with representatives of civil society
  - Ensure traceability and transparency in upcoming work steps of German implementer BGE
  - Meet about once a year and discuss BGE's work progress
  - 1. Forum Mainz (2022): 380 participants, 2. Forum Halle (2023): 530 participants



Stepwise process with public participation during siting

Step 2

… Proposal of regions

After step 2: BGE will submit to BASE proposal for regions to be explored above ground

Regional conferences

- BASE will examine proposal and establish a regional conference in each of the proposed regions
  - Comprehensive and continuous participation of the public in the siting regions
  - Organize their work on their own responsibility (with own office to support them)
  - BASE provides organizational and financial resources

The Council of the regions

- Support the regional conferences on national level
  - Promote dialogue between affected regions
  - Pick up rival regional interests and mediate between the perspectives and needs

General

- Search for a final repository is designed as a "self-questioning and learning process"
- Key players BASE, BGE and the National Citizens' Oversight Committee - to regularly review, further develop and, if necessary, adapt the existing participation formats

International activities at OECD/NEA:

Co-operation of Integration Group for the Safety Case (IGSC) with Forum of Stakeholder Confidence (FSC)

Objectives and some results from IGSC – FSC co-operation

Three joint workshops (with stakeholders) to

- better understand how uncertainties and the SC are perceived by different stakeholders
- develop joint views on ways towards better communicating the SC and addressing uncertainties

Some observations on uncertainties

- Uncertainties and unresolved issues should be addressed openly and competently to build confidence
- It is important to distinguish between risks (potential for harm) and uncertainties (lack of knowledge) in communicating safety
- Stakeholders want to be able to form their own view as to whether risks are acceptable and, where possible, to have some control in mitigating the risks

[Building Confidence in the Face of Uncertainty: The Role of the Safety Case (oecd-nea.org)]

[Communication on the Safety Case for a Deep Geological Repository (oecd-nea.org)]

Some key messages and feedback

To build trust, each must understand the other's issues and concerns

Experts and members of the public have different levels of understanding and areas of interest

Improved scientific understanding in the community creates trust

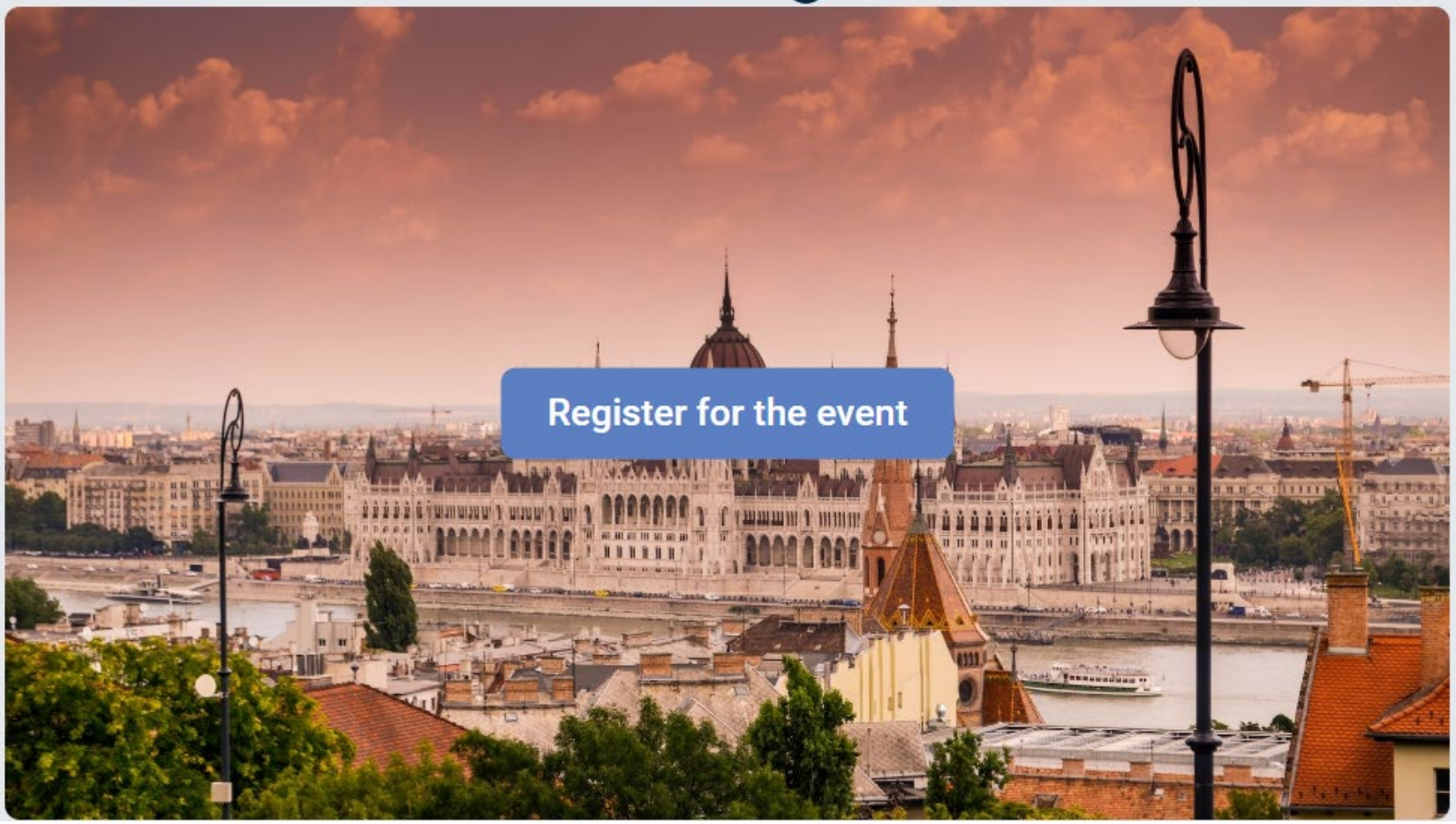
Trust in both the expertise of those assessing safety and the integrity of the experts and the organisations they represent is paramount to building stakeholder confidence

The diversity of expertise present in the public can provide creative insights and bring tools and learning from other areas

Trust is built by people (communication, competence, behaviour, authenticity…)

[Building Confidence in the Face of Uncertainty: The Role of the Safety Case (oecd-nea.org)]

Safety Case Symposium 2024: Moving towards the construction of a safe DGR – Getting real



- 8-11 October 2024
- Budapest, Hungary, hosted by PURAM

- Keynote lectures
- Plenary and poster sessions
- Expert panels
- Young generation network
- Site visit

- Registration closes: 30 June 2024

- Please find more information under https://www.oecd-nea.org/jcms/pl_79848/safety-case-symposium-2024-moving-towards-the-construction-of-a-safe-dgr-getting-real

Thank you for your attention!

Communicating SKB's safety case through siting and licensing

Allan Hedin, SKB

Current programme stage; spent fuel repository

Where are we now?

- SKB has obtained a general license for a final repository for spent nuclear fuel at the Forsmark site and an encapsulation plant in Oskarshamn
- Currently preparing a ”construction license application”
  - To be submitted in 2024
  - Beginning of construction planned for 2027

The past 25 years

- Entered site investigation phase around 2000
- Surface based site investigations in two voluntary municipalities 2002-2008
  - Forsmark site (in Östhammar) and Laxemar site (in Oskarshamn)
  - Both municipalities with established nuclear facilities
- Forsmark selected by SKB in 2009 based on its superior host rock
- General license application submitted in 2011
  - Repository in Forsmark, Encapsulation plant in Oskarshamn
  - Tried according to Act on Nuclear Activities and Environmental Code
  - Approved by the Swedish Government in January 2022

The spectrum of stakeholders
(other than SSM and the Land and Environment Court)

Stakeholders have widely differing interests in the safety case

- The local general public
  - Some are interested in a very broad sense
  - Others may really want to understand in depth, maybe in areas where they are themselves knowledgeable
- “Focus groups” organised by the involved municipalities
  - Often spend considerable time studying SKB reports
  - Engagement through numerous seminars and dialogues with SKB experts
- NGOs and NGO representatives
  - Are often unconvinced about the safety of a final repository
  - Will often challenge SKB to respond to opinions expressed by critical experts

Experiences in communication and engagement around the safety case (1/3)

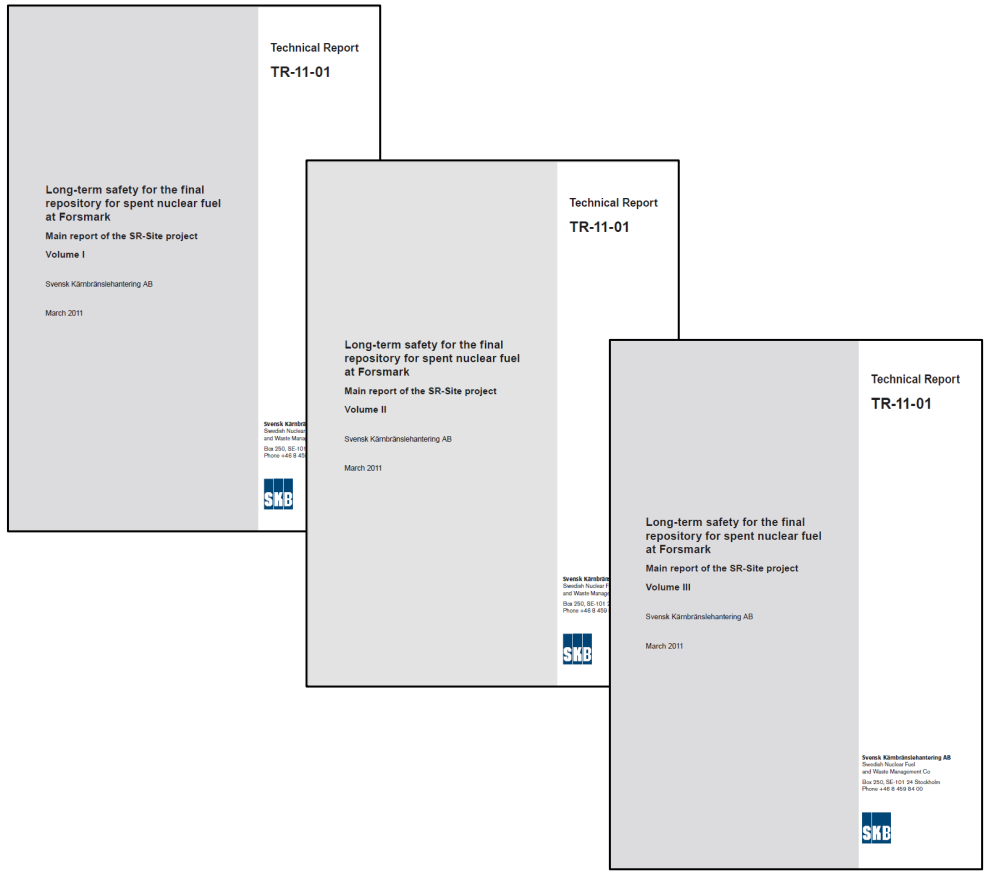
- Much of the experiences come from being active in the municipalities of Oskarshamn and Östhammar for more than 25 years
  - Broad scope of information and dialogue activities, where the safety case has been one important aspect
- The fact that both municipalities house nuclear facilities since decades has facilitated the dialogue
- The different roles with SKB as the implementer and SSM as the regulator has been an essential platform for SKB's communication of the safety case
  - Local focus groups generally see SSM as the authority that must do the more in-depth, critical review of SKB's safety case
  - SSM an also important actor in informing the public about laws and regulation to instigate higher confidence in the decision making process
    - And of course in explaining its findings in reviews of SKB's safety cases

Strål säkerhets myndigheten
Swedish Radiation Safety Authority

Experiences in communication and engagement around the safety case (2/3)

A scientifically and technically sound safety case is key to successful communication and engagement with stakeholders

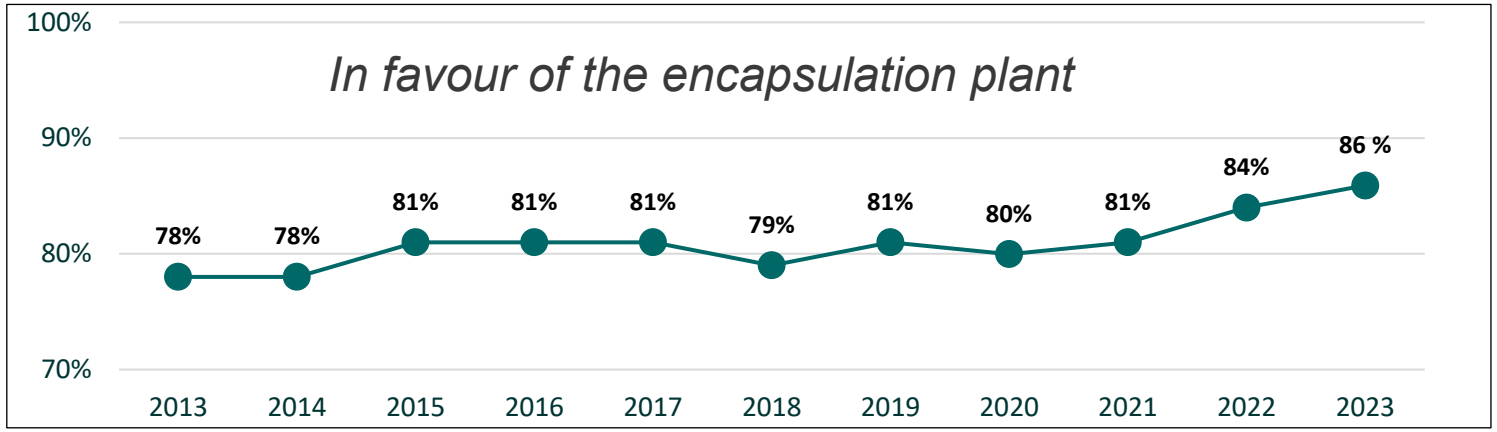
- Must be able to explain complex scientific matters in layman's terms…
  - …and to respond to questions and criticism by experts, sometimes at the same event
- Be transparent, also with what you don't know
  - Don't be afraid of talking about uncertainties, but make sure to put them in perspective
  - "What if" scenarios are often helpful
- Take care to disclose all data, and explain why some data may have been disregarded

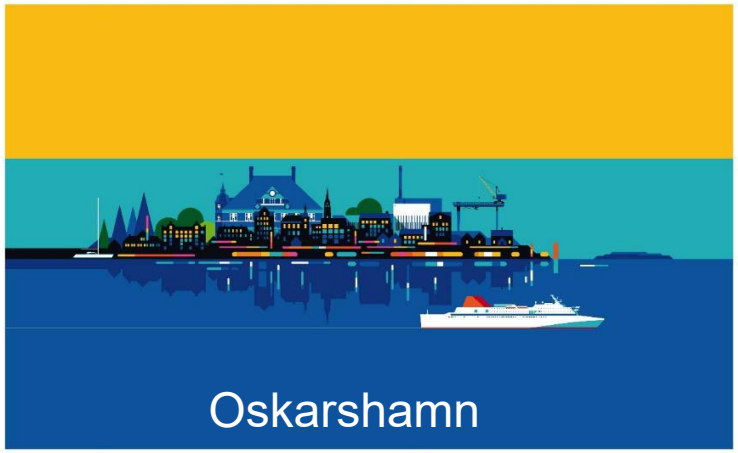


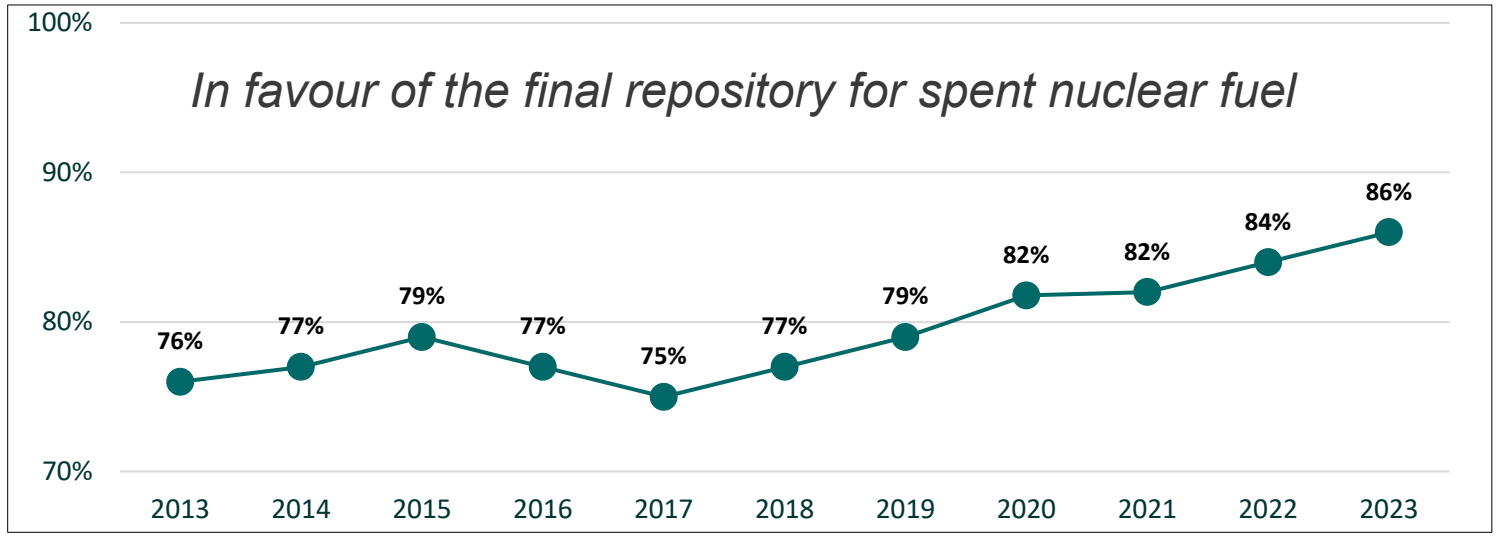
Experiences in communication and engagement around the safety case (3/3)

- Engage your technical and scientific experts in dialogues with stakeholders
- Be inclusive. Embrace also your opponents and be prepared
  - to stand up for the scientific basis of your safety case against ill-founded criticism,
  - but also to listen to and examine claims that could weaken your safety case
- Building public confidence is a long term effort
  - SKB has been active in the municipalities of Oskarshamn and Östhammar for decades

Local acceptance and continued involvement







Thank you for your attention!

Building and keeping trust – Role of Science/Technology in engaging different stakeholders

Pirjo Hellä, Principal Scientist
VTT Technical Research Centre of Finland

ICGR-7 Session 3B “Successful stepwise approaches in stakeholder engagement throughout DGR siting and the safety case”.

May 29th, 2024

VTT – beyond the obvious

Presentation content

- Nuclear Waste Management in Finland
- Building and keeping trust in an advanced programme
  - the ONKALO repository expected to start operation in few years
- Insights on new topics
  - Engaging indigenous people
  - SMR facilities and waste disposal

ONKALO, deep geological repository for spent nuclear fuel in Finland (illustration by Posiva Oy)

Roles in Nuclear Waste Management in Finland

LICENCES

The Finnish Government

Ministry of Employment and the Economy

MONITORING

Radiation and Nuclear Safety Authority (STUK)

FINANCING OF NUCLEAR WASTE MANAGEMENT

National Nuclear Waste Management Fund

Ministry of Employment and the Economy

TEOLLISUUDEN VOIMA OYJ

FORTUM POWER & HEAT

POSIVA OY

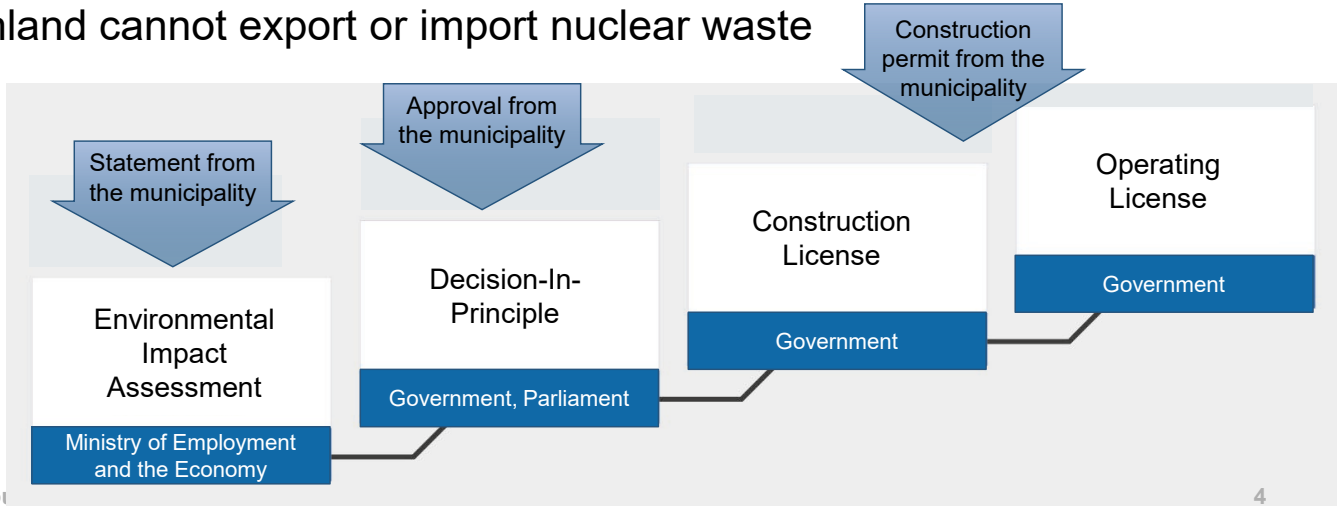
Consultants, research institutes, contractors, universities

Low and intermediate level radioactive waste from NPP operations (and industry, decommissioning) – predisposal issues and disposal repositories

High level radioactive waste (spent fuel)

Political decision making according to Nuclear Energy Act

- Two important laws regulating nuclear investments: EIA-law and Nuclear Energy Act (NEA)
- These laws include processes that increase transparency and local acceptance
- For the local municipalities, the most important parts of the NEA-law **are local councils' right of veto** and STUK's (regulator's) safety assessment
- According to law, Finland cannot export or import nuclear waste

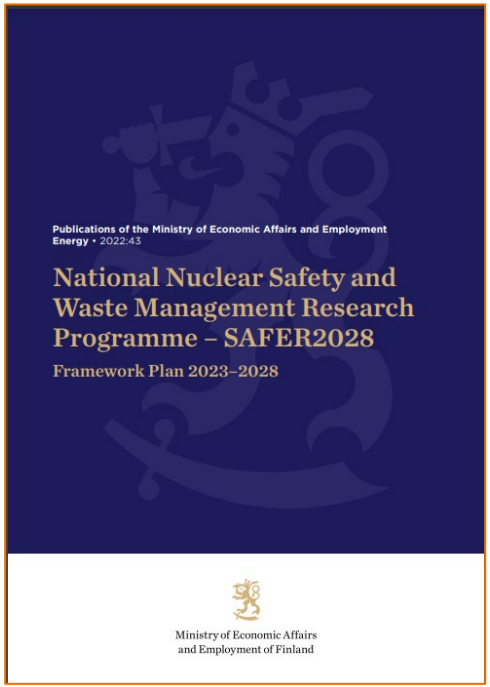


How science/technology is used to ensure performance and safety of a DGR?

- VTT in a role of TSO/R&D provider
- Stakeholders are government (TEM), regulator (STUK), locals (Eurajoki municipality) and wider public.
- Focus on ensuring performance of addressing the key issues with remaining uncertainties.
- Publicly funded studies with open, transparent and accessible information, in addition to commissions (confidential contracts)
  - the national R&D programme of SAFER (KYT earlier) and Euratom
- As a whole country, to work to solve these issues, so the R&D/TSO roles go together – VTT works with other parties (universities and companies) to constantly develop and iterate the solutions.

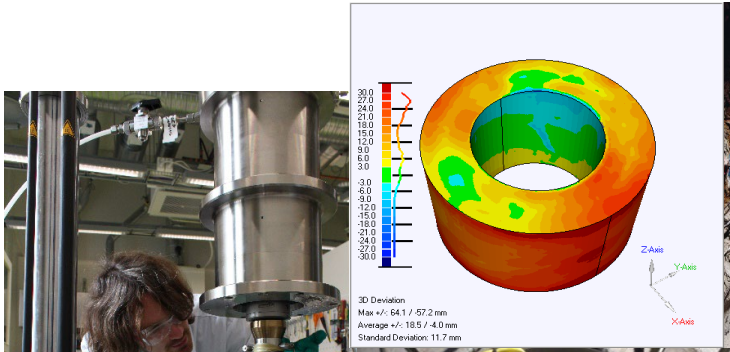
SAFER2028 - National Nuclear Safety and Waste Management Research Programme 2023-2028

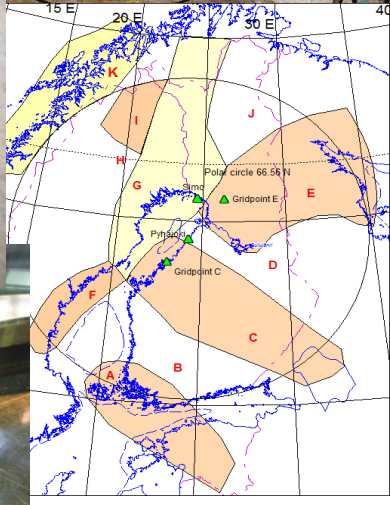
- Coordinated by VTT (governed by owners, government)
- 10 M€ euro annual funding, ~30 % of which is for nuclear waste management topics
- Main nuclear waste management topics:
  - Acceptability and social license, siting
  - Engineered barrier system performance; copper, bentonite, cement, microbial activity
  - Host rock
  - Radioecology
  - Spent fuel source term and low and intermediate waste gas generation
- International collaboration welcome, but non-Finnish bodies are not funded (in-kind collaboration)
- https://safer2028.fi gives more details – everything is public, including annual seminar (in English)



Examples of current HLW R&D ongoing

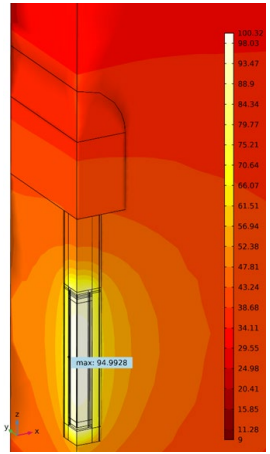
- Canister, lid, weld materials studies + NDE
- Bentonite materials (high temperature) and microbial assessments, manufacturing (blocks, pellets, QC)
- In-situ demonstrations at ONKALO, including full-scale EBS and monitoring systems
- Long-term models for safety assessment such as seismicity and climate change impacts (flood risks)

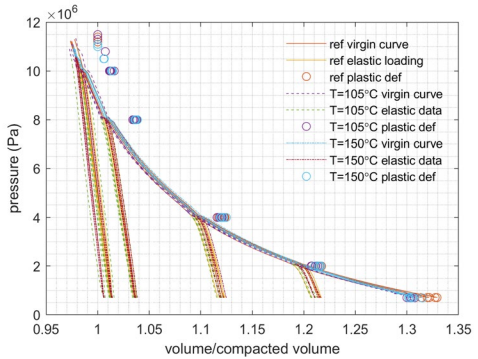




Influence of temperature on clay-based material behaviour (EU-EURAD HITEC Work package) – Example A

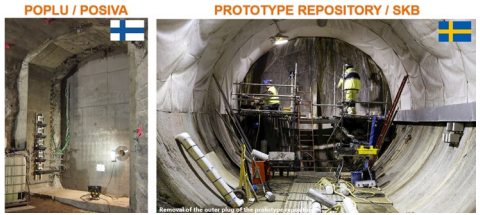
- **Project objective:** HITEC aims to develop improved understanding of clay-based materials exposed to elevated temperatures to evaluate if elevated temperature limits (of 100-150°C) are feasible and safe for geological disposal concepts
- **Client & funding source:** European Joint Programme on Radioactive Waste Management European commission (EURAD project) with co-funding from Posiva for VTT's work
- **Key tasks:**
  - Clay host rock (focus for other partners)
  - Clay buffers: focus for VTT/Finland
- **Key outcomes:**
  - Costs: Repository layouts are based on thermal dimensioning
  - Safety: Increased safety margins

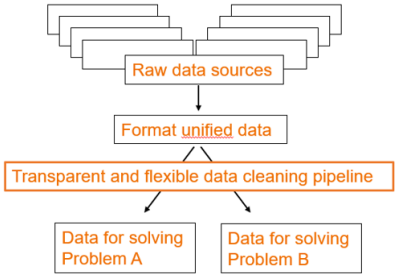


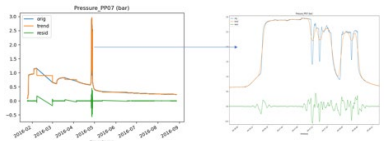


MODATS - MOnitoring equipment and DAta Treatment for Safe repository operation and staged closure – Example B

- **Project objective:** Evaluate, develop and describe methods and technologies, and to provide the means to measure, treat, analyse and manage data in a consistent manner.
- **Client & funding source:** EURAD – European Joint Programme on Radioactive Waste Management
- **Key tasks:**
  - Analyzing existing URL experiment datasets
  - Identifying unique needs and restrictions that apply to data analytics in the context of nuclear waste repository monitoring and data management.
  - Defining data management and analyzing use cases for the repository data.
- **Key outcomes:**
  - Improvement of data management workflow.
  - Development of modular tools to be integrated or used as standalone in data analysis and decision making.



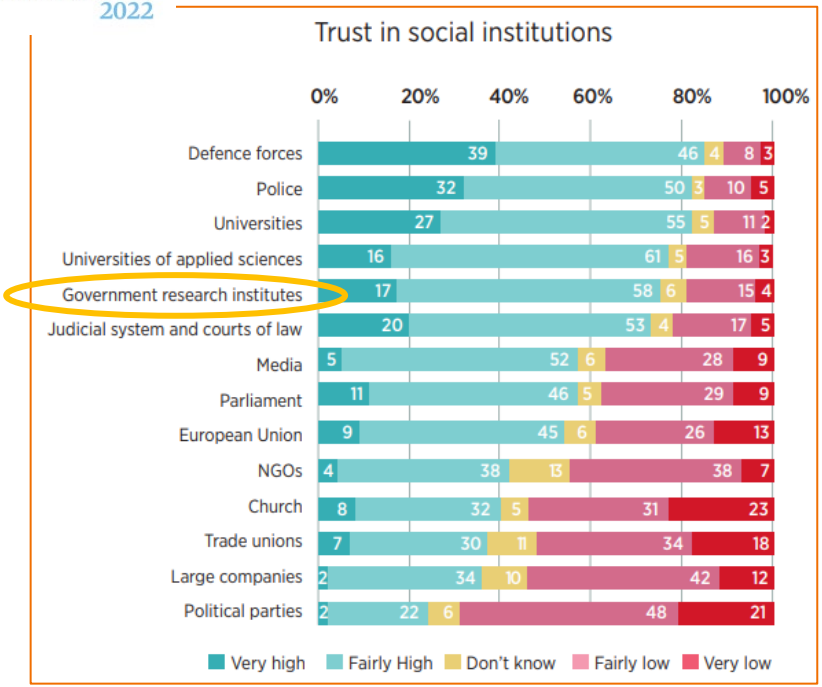


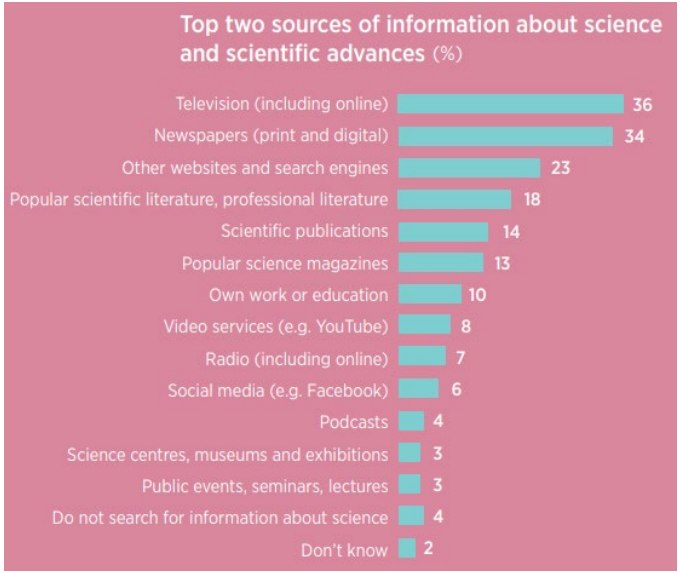


Trust for Finnish science and research organisations

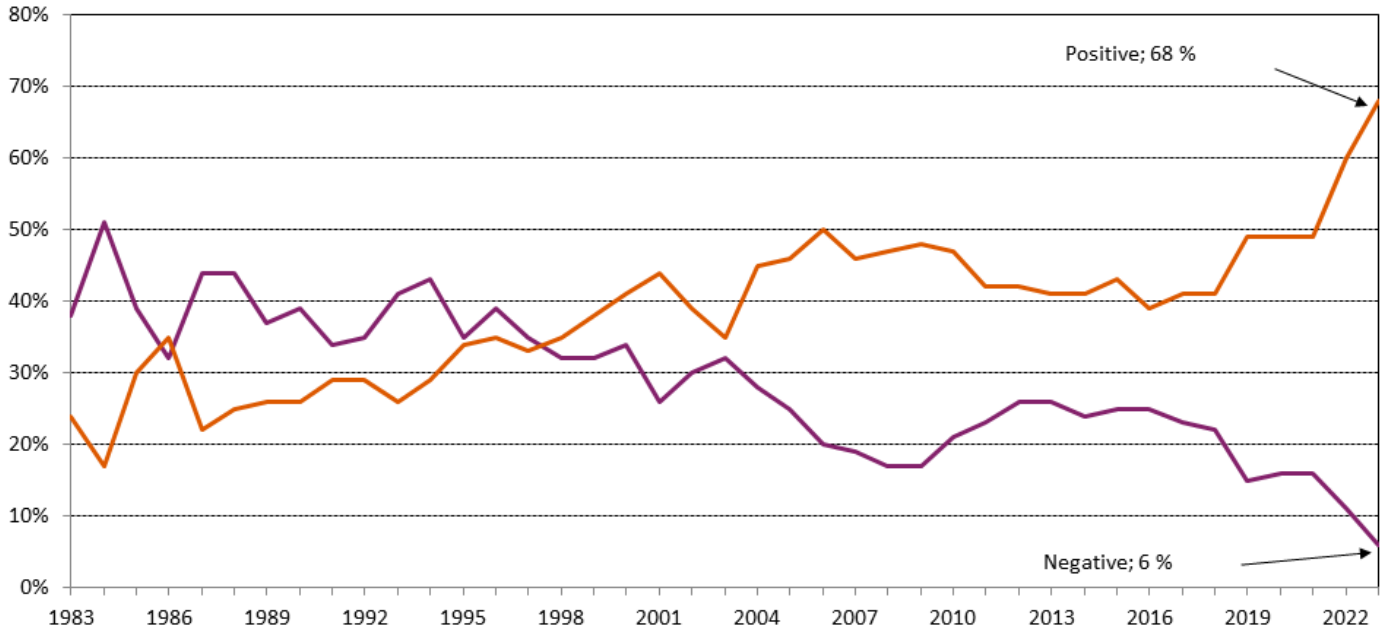
Summary of the Finnish Science barometer 2022
A STUDY OF PUBLIC OPINION AND ATTITUDES TOWARDS SCIENCE AND TECHNOLOGY IN FINLAND

Full report:
https://www.tieteentiedotus.fi/files/tiedebarometri_2022_en.pdf





Development of the acceptance of nuclear power as an energy source in Finland 1983-2023



Energiateollisuus

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Eurajoki Citizens: Expectations & Welfare

- **Safety is the most important factor of all**
- We have to take care of our own nuclear waste (fairness and responsibility)
- No need to delay final disposal without important reason
- **Solutions have to be today's technology**
- **Retrievability option,** but without safety risks
- Long-term political commitment (several strategic decisions-in-principle)
- **Municipality has a right of veto when making decisions in principle**
- Roles and responsibilities have to be clear
- Up-to-date requirements and control over whole life cycle - STUK (regulator) verifies safety at all stages
- STUK is a highly valued regulator – independent of subscriber, supplier and political decision making

- TVO and Posiva pay real estate taxes to municipality
- Steady income, easy to make longstanding plans
- Employees and workers pay income taxes to municipality
- Business opportunities for local companies
- New jobs, a lot of local people work at the site
- Cooperation with Posiva concerning Vuojoki mansion, economical benefit straight away after the site selection
- TVO and Posiva's sponsorship to local organizations

The Sámi Indigenous Population in Europe

- The Sámi people are the **only ethnic group classified as an indigenous people** in the European Union
- Sápmi, the Homeland of the Sámi Indigenous Peoples, is situated in northern parts of Finland, Norway, Russia (the Kola Peninsula) and Sweden
- Indigenous Sámi population: estimated 75 000 to 100 000.
- Traditionally made their living from reindeer herding, fishing, gathering, hunting, handicrafts.
  - A special concern restricted land use for reindeer herding
- In Finland, there are around 10,000 persons who are recognised as Sámi, granted a constitutional status as an Indigenous Peoples to maintain and develop their language and culture.

Sources: The Sámi – Sacred Land
Heinämäki, 2023
Tervo et al., 2022

The role of municipalities on land use in Finland: Societal engagement for SMRs

- In Finland, **the State does not play a major role in decision making on land use**, since **municipalities have a monopoly on land-use planning** - municipalities control the statutory land-use planning within their jurisdictions.
  - Even in large-scale projects with national significance, the municipality in which the project will be sited has a monopoly on deciding whether the area designated for the project will be planned in detail for the purpose or not (Nysten-Haarala et al., 2021).
- In Finland, we studied the societal engagement from municipalities' perspective with regards future SMRs siting and SMRs waste management (SMR for district heating).

SMR siting and SMR waste management: Recent research insights from Finland

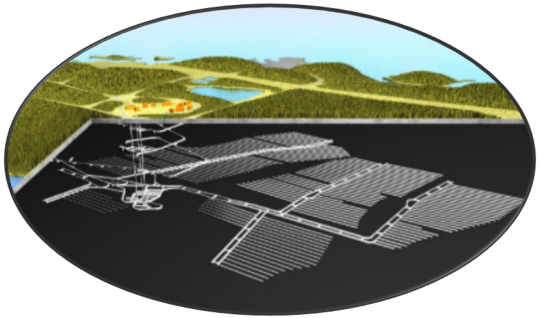
- In an ongoing research project funded by SAFER2028 (National Nuclear Safety and Waste Management Research Programme 2023-2028), LUT and VTT in Finland studied **the public opinion and societal engagement on SMR siting and SMR waste management** (Naumer et al., 2024)
  - Perspective and needs of interested municipalities and also capital area residents were studied and preliminary roadmap for addressing societal engagement issues was drafted. The insights may be relevant for societal engagement in the Sámi Indigenous areas in the future.

- The 2022 resident survey (2014 Finnish speaking residents, aged 18-75) results on the principles of nuclear waste management: while most of the respondents favour a centralised solution, the women respondents emphasise the moral obligation of the municipality to also take its responsibility by disposing of the nuclear waste within its borders.

- About a third of the respondents would accept the disposal of spent nuclear fuel in their own municipality, and about a third of respondents supported the idea of returning nuclear waste to the foreign SMR manufacturer. The key actors should publicly outline their scenarios for the nuclear waste management, including possible siting options (Naumer et al., 2024)

Summary

- Trust is built on:
  - the stringent regulatory requirements,
  - the well-defined roles, responsibilities and processes,
  - the technical expertise,
  - readiness for continuous improvement, and
  - open, transparent communication and accessible information



ONKALO, deep geological repository spent fuel in Finland (illustration by Posiva Oy)

- VTT as a TSO/R&D provider is a key player in supporting the licensees, regulators and government:
  - address key uncertainties and emerging issues, including new technologies
  - keep the dialogue transparent; to maintain stakeholder confidence
  - cooperation is key, also for joint worldwide success and safety

Thank you!

For further information: pirjo.hella@vtt.fi

Acknowledgements: Erika Holt, VTT

Communication approach and the role of a safety case in the siting process in Japan

7th Edition of the ICGR

Session 3B

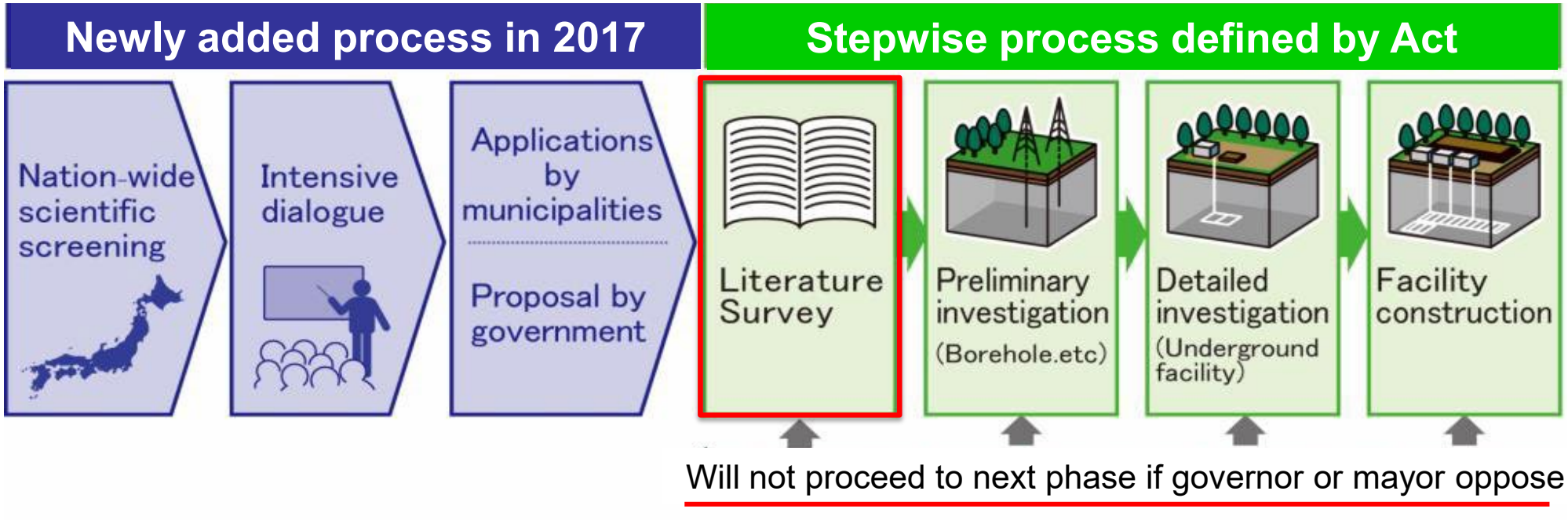
Successful stepwise approaches in stakeholder engagement throughout DGR siting and the safety case

Tetsuo FUJIYAMA

Nuclear Waste Management Organization of Japan (NUMO)

29 May, Busan, Republic of Korea

Siting process of DGR in Japan



- In 2002, NUMO started open solicitation process – however, no volunteer municipalities appeared for a long time.
- In 2017, the Japanese government published the Nationwide Map of “Scientific Features relevant for Geological Disposal” in order to enhance public understanding of GDR program.
- In 2020, Suttu town applied for and Kamoenai village accepted a proposal for a Literature Survey by the government.

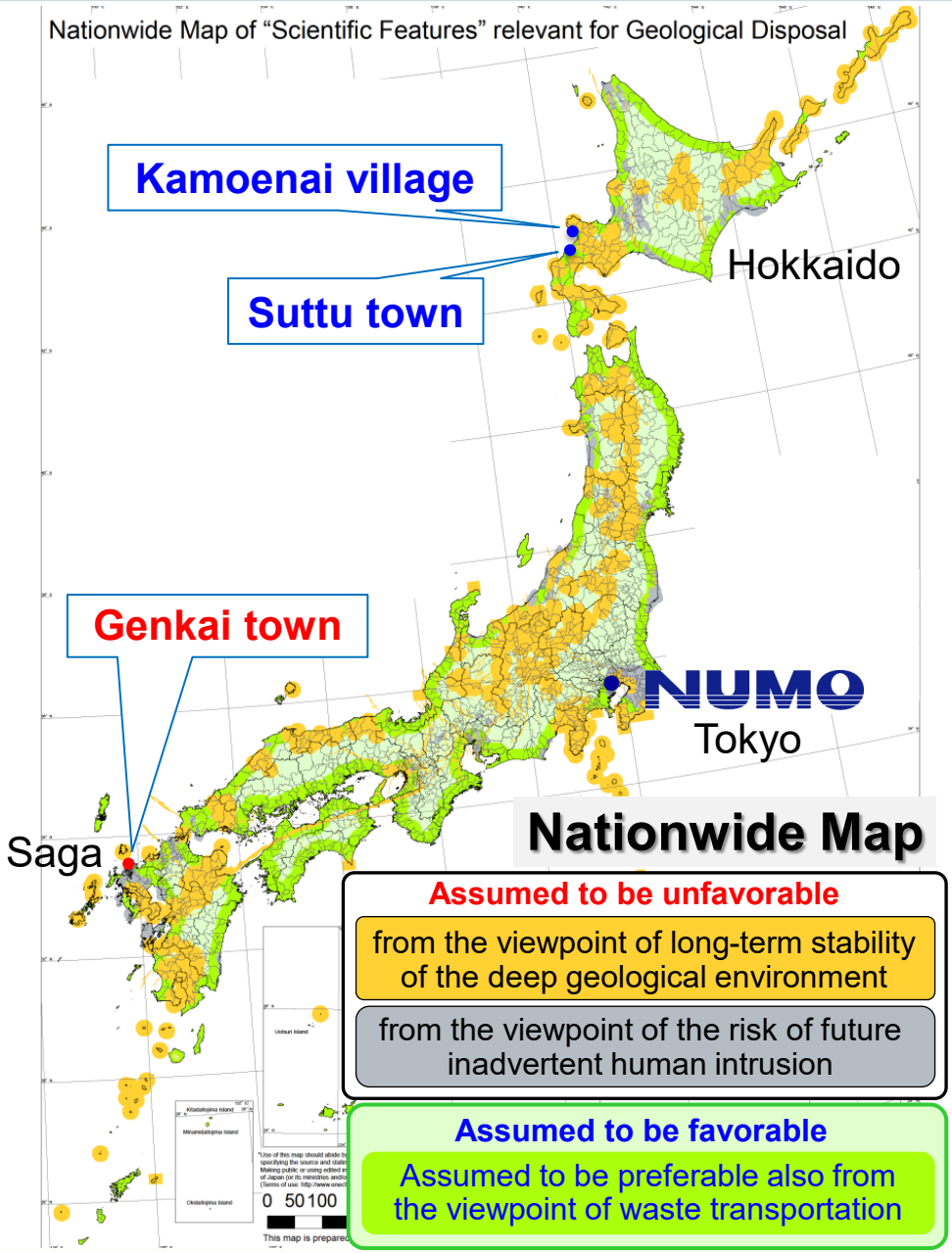
Current status of the siting process

For Suttu and Kamoenai

- NUMO presented the draft report of LS results in February 2024, and will explain the LS results to the local communities.
  - The mayors and the Hokkaido Governor will decide whether to proceed to PI stage.

For nationwide

- The government and NUMO are proceeding with a dialogue campaign throughout Japan to solicit more volunteers.
  - New! Genkai Town have decided to accept a proposal for a LS on 16 May, 2024.



Communication approach for nationwide in Japan

- Promote public understanding about DGR program in order to;
  - have more municipalities
  - foster people's feeling of respect and gratitude for the volunteer municipalities
- Enhance nationwide communication activities
  - Nationwide symposia and public meetings etc.
- Provide plain explanations regarding the feasibility of DGR
  - Provide answer to people's concerns with plain materials
    - ✓ to non-experts; safety against earthquake, abnormal events, …
    - ✓ to scientists/engineers that are not familiar with GDR project; feasibility of selecting a long-term stable geological environment in Japan
  - A safety case is the technical basis for all of explanations

Nationwide communication activities

Study sessions,
facility visits, symposia

Support for the Stakeholder Study Groups

Nation-wide public meetings

Education of young generations
(Support for school teachers, Teaching in school classes by NUMO staff)

Visits to municipalities, economic organizations, etc.

PR events
(with PR vehicle)

Communication activities

Information offering

Owned media
(website, brochures, etc.)

Media relations
(Providing information and responding to inquiries)

Mass media
(Web ads, newspaper ads, radio commercials, etc.)

Social media
(Facebook, X, Instagram)

PR vehicle “Geo-Labo”

Nation–wide symposia

Recent Nation-wide public meetings

FY	Number of meetings	Total participants
2019	30 places	688 people
2020	10 places	140 people
2021	18 places	279 people
2022	22 places	387 people
2023	22 places	544 people

Communication approach for Suttu and Kamoenai

- Provide information about DGR program and Literature survey, listen to stakeholders' concerns and thoughts in order to;
  - deepen mutual understanding between the local communities and NUMO
  - build trust in DGR program and NUMO
- Set up a platform where local communities can learn about the DGR project and discuss development of the regions
  - small-group, face-to-face information sessions etc.
- Establish local offices for communication with residents

✓ Stakeholder engagements would become active with continuous efforts of communications.

NUMO local office in Suttu Town

“Place for Dialogue” at the two communities

- In 2021, “Place for Dialogue” was established in both Suttu Town and Kamoenai Village. This serves as a platform where local residents and stakeholders can learn about the DGR project and hear about progress of the Literature Survey.
- Local residents discuss their concerns and interests guided by neutral facilitators.

Suttu Town

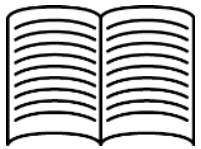
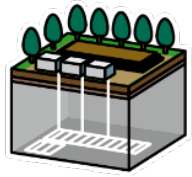
Members; 15 persons

Kamoenai Village

Members; 19 persons

Role of a safety case in the siting process

- Explanations of safety based on well-established safety case are essential in communication on DGR.
- Development of a generic safety case from the pre-siting stage is important to build technical feasibility/confidence of the DGR project.
- The focus of site investigations will change with the progress of the site selection stages and the suitability of the site will become clearer, based on confidence shown by safety case updates.

Literature surveys	Preliminary investigation	Detailed investigation	Selection of repository site
			
Avoiding significant effects of natural phenomena such as volcanic activities and fault movements	Confirmation of results of LS and understanding of the geological environment	Evaluation of containment and isolation safety functions through repository design and SA	

Thank you

Nuclear Waste Services

Working with Siting Communities in the UK: Building trust, delivering safely

Lucy Bailey

Chief of Disposal Safety, NWS

Status of the UK GDF programme

- A stable policy environment: Working with Communities, 2018
- Key requirement is a suitable site with a willing community
- Hence focus on site characterisation & community engagement
- Three communities engaged in siting process, in each exploring disposal under the seabed in UK ‘inshore’ water

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Building understanding & trust

- Trust in a clear process
  - Community Partnership
  - Social justice
- Trust in NWS and our people
  - Delivering on promises
  - Integrity and empathy of staff
- Trust in technical outcome
  - Competence, reputation
  - Open & accessible safety case
  - Valuing local knowledge
  - International consensus, peer review

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Trust in our Siting Process

- Consent-based process with 3 stages:

1. Interested party – informal talks
2. Working group – begins dialogue with community, identifies search area
3. Community partnership – must include relevant principal local authority, identifies priorities for community investment funding, makes recommendation re right of withdrawal or test of public support

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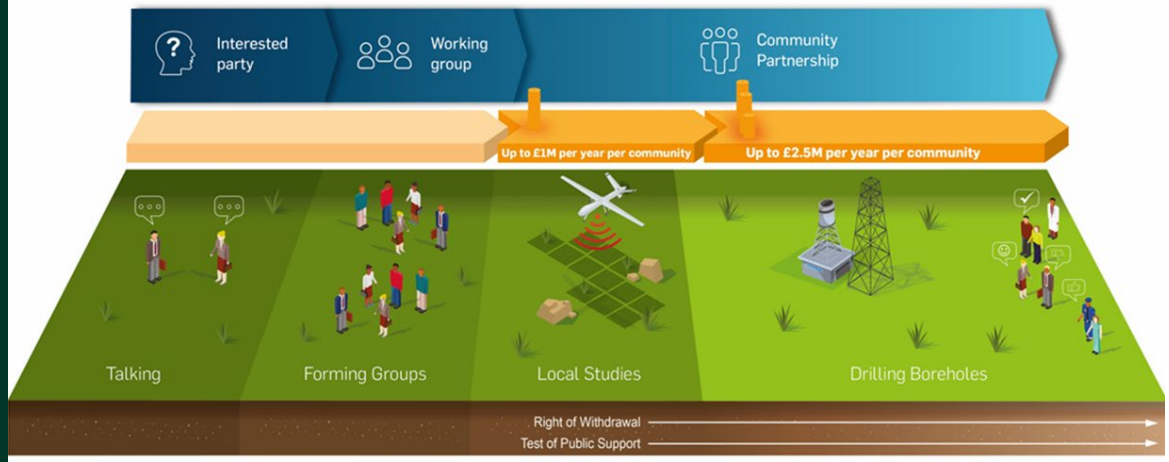

Trust in our People

- Technical experts able to engage well and respectfully with communities
- Staff proud to work for NWS
- External reputation of individuals and NWS
- Recognition from independent experts, e.g. academic community (value of NWS Research Support Office)

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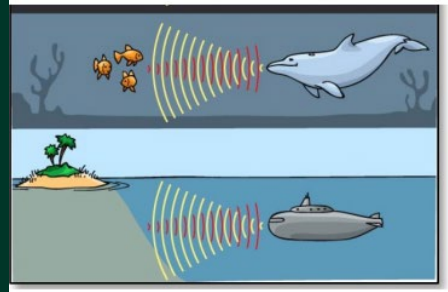
Trust in our Safety Case

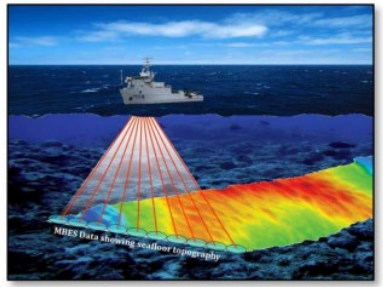
- Making our science accessible
- Example – successful community engagement re understanding offshore seismic surveys and follow-up community visit to British Geological Survey core store
- Seeking and valuing local knowledge
- Empowering community stakeholders through early dialogue and developing the safety case in a way that reflects their needs and expectations increases both the robustness of the safety case and confidence in the safety case

Nuclear Waste Services

Seismic - Seeing With Sound

- Imaging with sound occurs in nature, e.g. bats and dolphins
- The distance to the object is determined by the time between the pulse being sent, and the reflected pulse recorded:





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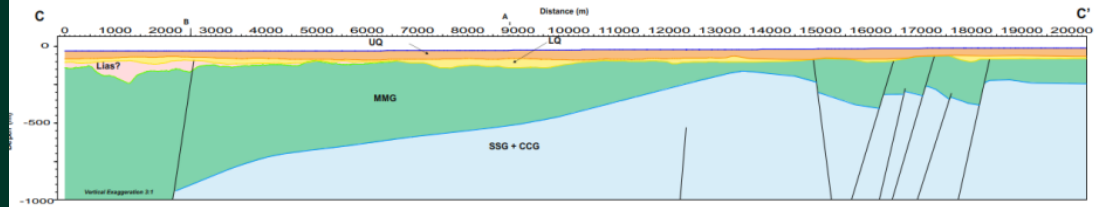
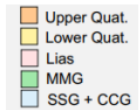
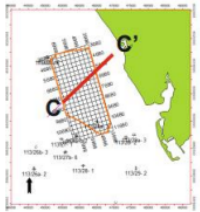
Seismic Interpretation – cross sections



- Cross sections, derived from the initial seismic interpretation, are being used by our Engineering and Safety case teams
- These data have indicated that there is potentially suitable geology within the Copeland 3D area





“Communities are at the heart of everything we do. We have a duty to protect people and the environment, and to keep communities informed about our work in their area while listening to their feedback. We strive to add social value to these communities by creating local job opportunities, bringing significant additional investment and supporting their vision for their area.”

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